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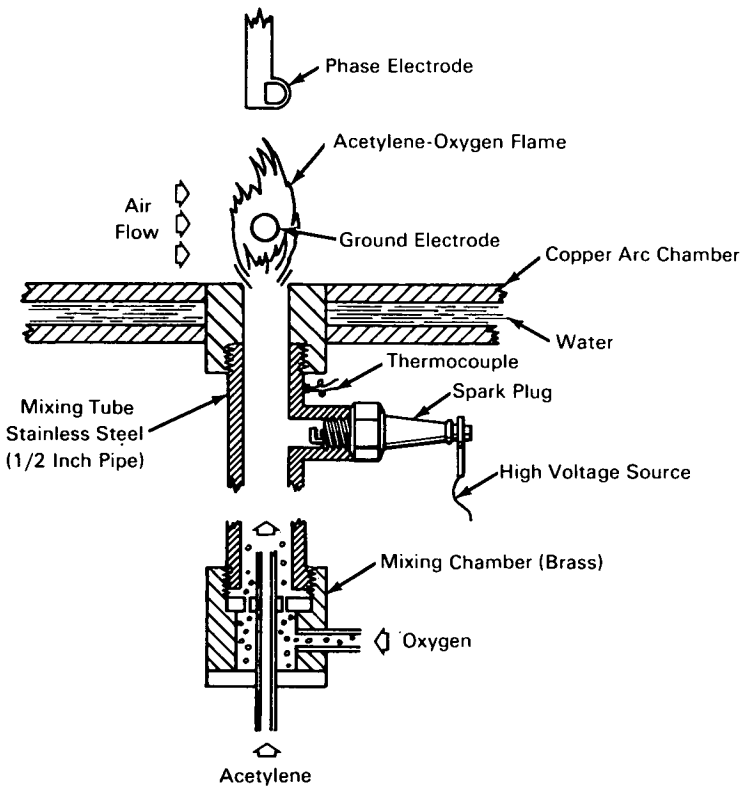
NASA TECH BRIEF

Electric Arc Heater Is Self Starting



The problem:

To initiate an electric arc between two water-cooled copper electrodes of an arc heated wind tunnel. One method is to "short out" the electrodes with a metal wire; this is inconvenient because it requires that the arc unit be disassembled between test runs. Another method is to apply a high voltage across the electrodes; this becomes inconvenient because of electrical insulation problems.

The solution:

A remote method initiating an electric arc over a large range of electrode gaps (up to 1-1/2 inches) without the inconvenience of disassembling the arc unit.

How it's done:

A mixture of oxygen and acetylene is introduced into the space between the water-cooled electrodes and

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an electric spark ignition is supplied by an automotive type spark plug and high voltage coil. The resulting ignition of the oxygen-acetylene mixture creates enough ionized particles to establish and maintain an arc between the water-cooled electrodes. The oxygen and acetylene are introduced through a mixing head into a stainless steel mixing tube with a system of stainless steel pipes with remotely controlled valves, check valves, and pressure relief built into the system.

Notes:

1. This type of starting system has been used on both three-phase ac arc heaters and on a dc arc heater.
2. This type of starting has operated on electrode spacings up to 1-1/2 inches at atmospheric pressure.
3. Copper pipe or tubing must not be used in this device because acetylene in contact with copper forms explosive acetylides.
4. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   Langley Research Center
   Langley Station
   Hampton, Virginia, 23365
   Reference: B66-10230

Patent status:

No patent action is contemplated by NASA.

Source: Ronald D. Brown
(Langley-208)